11.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

11.1 BACKGROUND

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§ 305(b)(2)).

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§ 305(b)(4)(A)).

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries' EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§ 305(b)(4)(B)).

- EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA § 3). For the purpose of interpreting this definition of EFH: waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 C.F.R. 600.10). "Adverse effect" means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 C.F.R. 600.810).

- EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action as described in the Action Agencies' UPA would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

11.2 IDENTIFICATION OF EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999) and longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California north of Point Conception to the Canadian border. Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information. For purposes of this analysis, this Opinion addresses potential effects to chinook and coho salmon.

Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California, and seaward to the boundary of the U.S. exclusive economic zone (596 miles) (PFMC 1998a, 1998b).

Detailed descriptions and identifications of non-salmonid EFH are contained in the fishery management plans for groundfish (PFMC 1998) and coastal pelagic species (PFMC 1998a). Casillas *et al.* (1998b) provide additional detail on the groundfish EFH habitat complexes. NOAA Fisheries has identified seven groundfish habitat complexes (estuarine, rocky shelf, non-rocky shelf, neritic zone, oceanic zone, continental slope/break and canyon) and identified species that may occur in each of those areas. The estuarine complex, which (with the neritic zone) is pertinent to this consultation, includes those waters, substrates and associated biological communities within bays and estuaries of the EEZ, from mean higher high water level (MHHW) or extent of upriver saltwater intrusion to the respective outer boundaries for each bay or estuary, as defined in 33 CFR 80.1 (Coast Guard lines of demarcation). The neritic zone is the relatively shallow ocean that extends from the outer edge of the intertidal zone to the edge of the continental shelf. It therefore contains the Columbia River plume. Two groundfish, two coastal pelagic, and two salmon species (chinook and coho) are included in the action area for the UPA (Table 11.1).

Table 11.1. Non-salmonid Fish Species with EFH in the action area for operation of the FCRPS and 19 USBR projects in the Columbia basin.

Species	Habitat Preferences
Starry Flounder *Platichthys stellatus*	mud, sand; often found in estuaries and upstream in freshwater
English sole *Pleuronectes vetulus*	sand, mud
Northern Anchovy *Engraulis mordax*	pelagic
Pacific Sardine *Sardinops sagax*	pelagic

Source:
Casillas, E., L. Crockett, Y. deReynier, J. Glock, M. Helvey, B. Meyer, C. Schmitt, M. Yoklavich, A. Bailey, B. Chao, B. Johnson, and T. Pepperell, 1998. Essential Fish Habitat West Coast Groundfish Appendix. Seattle, Washington, National Marine Fisheries Service: 778 pp. Emmett, R. L., S. L. Stone, et al. (1991). Distribution and abundance of fishes and invertebrates in west coast estuaries, Volume II: Species life history summaries. Rockville, MD, NOAA/NOS Strategic Environmental Assessments Division**:** 329.

11.3 PROPOSED ACTION

For this EFH consultation, the proposed action and action area are described in the Action Agencies' November 2004 Updated Proposed Action (UPA) and previously in Section 5.0 of this Opinion, respectively. The action area is in portions of the states of Oregon, Washington, and Idaho that are also within the range of essential fish habitat (EFH) designated under the MSA. The action area relative to both juvenile and anadromous salmonids is that part of their in-water and riparian habitat that would be affected by the proposed operation of the FCRPS dams and 19 USBR projects and the non-hydro offsets described in the UPA. This area serves as a migratory corridor for juveniles and adults of five ESA-listed species of chinook salmon (SR spring/summer and fall chinook salmon, UCR spring chinook salmon, UWR chinook salmon, and LCR chinook salmon) and one species of coho salmon (LCR coho) that is proposed for listing, all of which are considered in this Opinion. The area serves to a varying extent as habitat for spawning, rearing, and growth and development to adulthood for these salmonids. EFH is also designated in the action area for unlisted species of chinook salmon: the Deschutes River summer/fall-run, mid-Columbia River (MCR) spring-run, and UCR summer/fall-run chinook ESUs. The proposed action includes the effects of flow on essential fish habitat in areas of the Columbia River estuary and plume used by groundfish and coastal pelagic species for which EFH is designated.

11.4 EFFECTS OF PROPOSED ACTION

As described in Section 6.0 of this Opinion, the continued proposed operation of the FCRPS dams and 19 USBR projects and the non-hydro offsets may result in short- and long-term impacts, both positive and negative, to a variety of habitat parameters. The adverse impacts to EFH for both listed and unlisted chinook and proposed coho salmon are the same as those described for ESA-listed salmonids. Therefore, the ESA effects analysis in this Opinion addresses impacts of the proposed action to salmon EFH. As described in the following sections,

the proposed operation of the FCRPS dams and 19 USBR projects is likely to negatively affect some properties of designated EFH.

11.4.1 Effects on Mainstem Habitat Conditions, Including the Estuary and Plume

11.4.1.1 Effects of Flow Management on EFH

11.4.1.1.1 Effects of Flow Management on EFH for Salmonids. Compared to the reference operation, the proposed action would slightly reduce flows in the lower Columbia River during the spring (Section 6.2.1.1 and Table 6.3). During this period, yearling migrant SR spring/summer chinook, Deschutes River summer/fall chinook, UCR spring chinook, and MCR spring chinook, and yearlings from the Hood, Sandy, and Kalama river populations of (spring-run) LCR chinook salmon are migrating through the action area. Because the difference in spring flow is minimal, the proposed action is not likely to have more than a minimal effect on the functioning of either the migration corridor or juvenile rearing habitat during this period.

Summer flows below Bonneville Dam would be significantly lower under the UPA than under the reference operation (Section 6.2.1.1 and Table 6.3). Snake River fall chinook and UCR summer/fall chinook produce subyearlings that migrate through and rear within the mainstem during summer, as do migrants from many populations of LCR (fall-run) chinook salmon. The acreage of shallow-water estuarine rearing habitat available under the proposed summer operation would be similar to that available under the reference operation, but with differences greatest in the upstream tidally influenced reach closest to Bonneville Dam. Fall and winter flows associated with the proposed hydro operation would be somewhat higher than those associated with the reference operation, but it is unlikely that the higher flows would have a significant effect on mainstem spawning of SR fall chinook salmon.

Some water quality conditions associated with the proposed hydro operation could decline with lower flows during summer months. Higher summer water temperatures would most likely affect migrating juvenile SR fall chinook salmon and some populations of rearing LCR fall chinook. Additionally, warmer summer temperatures could affect migrating adult chinook salmon from several ESUs.

11.4.1.1.2 Effects of Flow Management on EFH for Groundfish. Two groundfish species, the starry flounder and English sole, are likely to have designated essential fish habitat in areas affected by the proposed action. Starry flounder spawn in the ocean, and juveniles enter the estuary at a young age where they are associated with the bottom, feeding on amphipods and copepods (Fox et al. 1984). They are distributed throughout the estuary but younger fish (less than 2 years) are more concentrated in the freshwater or low salinity areas. Fish older than 2 years are more concentrated in areas of higher salinity. During spring, abundance is generally low and flounder are restricted to part of Youngs Bay and an area between Tongue Point and Woody Island (approximately RM 29). During summer and fall, they are more widely distributed but are most abundant in areas of low velocity currents such as Grays Bay, Youngs Bay, Baker Bay, Cathlamet Bay, and intertidal habitats, where their principal prey, amphipods, concentrate.

The English sole is a marine species that is associated with the bottom for most of its life cycle. It prefers high salinities and therefore is found only in the downriver portions of the estuary where the population, primarily juveniles, feed and rear (Fox *et al.* 1984). English sole eat mainly copepods, amphipods, and mysids, but also incorporate the clam *Macoma balthica*, polychaetes, and oligochaetes into their diet. Sole less than one year old are localized in low-velocity, shallow areas such as the Ilwaco and Chinook channels during spring but are distributed further upriver in relatively saline water during summer and fall. Both their relative abundance and distribution in the estuary decrease in winter. Relatively few of the individuals in the estuary are one year old or older, and these are found downriver from the Astoria-Megler bridge year-round.

Both species are associated with low- velocity, shallow-water habitat in the estuary, where their prey are abundant. Thus, effects on estuarine EFH are likely to be similar to those described in Section 11.4.1.1.1 for subyearling salmon. That is, the difference between flows in the lower Columbia River under the two operations will be small during spring but more significant during summer. In terms of the acreage of shallow-water low-velocity habitat, the two operations will be similar, with differences greatest in the upstream tidally influenced reach closest to Bonneville Dam.

11.4.1.1.3 Effects of Flow Management on EFH for Coastal Pelagic Species. Northern anchovy are distributed from the Queen Charlotte Islands, British Columbia, to Magdalena Bay, Baja California, and anchovy have recently colonized the Gulf of California (PFMC 1998c). The population is divided into northern, central, and southern subpopulations, or stocks. The southern subpopulation is entirely within Mexican waters. The central subpopulation, which supports significant commercial fisheries in the U.S. and Mexico, ranges from approximately San Francisco, California to Punta Baja, Baja California. The bulk of the central subpopulation is located in the Southern California Bight, a 20,000-square-nautical-mile area bounded by Point Conception, California in the north and Point Descanso, Mexico (about 40 miles south of the U.S.-Mexico boarder) in the south. The geographic distribution of northern anchovy has been more consistent over time and is more nearshore than the geographic distribution of Pacific sardine.

The northern anchovy is commonly found both within the Columbia River estuary and offshore in large schools during all seasons. Adults spawn in the ocean, but all life stages can be found in the estuary where they feed mostly on copepods (and some phytoplankton) in the water column (Fox *et al.* 1984). Fish older than one year prefer higher salinity areas and are found further upriver when outflow is lower.

It is generally accepted that sardine off the West Coast of North America form three subpopulations or stocks: a northern subpopulation (northern Baja California to Alaska), a southern subpopulation (off Baja California), and a Gulf of California subpopulation. A fourth, far northern, subpopulation has also been postulated (PFMC 1998c). Although the ranges of the northern and southern subpopulations overlap, the stocks may move north and south at similar times and not overlap significantly.

Pacific sardines are pelagic at all life history stages. They occur in estuaries, but are most common in the nearshore and offshore domains along the coast. They have been captured in both purse and beach seines in the Columbia River estuary, often with anchovies. Like the northern anchovy, sardines are planktivorous, consuming both phytoplankton and zooplankton.

The difference between flows in the lower Columbia River under the proposed and reference operations would be small during spring but more significant in summer. For pelagic species, the reduction in summer flows means that the aerial extent of the low salinity environment in the plume will also be reduced. However, there is little information regarding the manner in which coastal pelagic species use features of the estuary or plume environment or how habitat use is affected by changes in flow on the order of the difference between the reference operation and the proposed action.

11.4.1.2 Effects of John Day Reservoir Elevation on EFH for Salmonids

The proposed action would raise the elevation of the John Day pool from minimum operating pool (MOP) to the minimum elevation required for irrigation withdrawals (Section 6.2.1.2). Ocean-type SR fall chinook rear primarily in lower Snake River reservoirs, particularly Lower Granite pool, and these fish have migration rates similar to spring migrants through the lower Columbia River during the summer months. This operation is expected to have a minor impact on the rearing habitat for SR fall juvenile chinook in this area, which has already been significantly modified from riverine conditions by the existence of John Day Dam and Reservoir.

11.4.1.3 Effects of Spill Operations on EFH for Salmonids

Compared to the reference operation, the proposed hydro operation would reduce spill at all FCRPS mainstem dams. The reduction in spill is particularly noteworthy during the spring migration period at Little Goose, McNary, and John Day dams, all of which are limited to a 12-hour spill operation for fish passage in the proposed action. Reduced spill primarily affects the ability of juvenile migrants to safely pass dams, which function as partial barriers to migration and can also result in migration delays. Reducing spill would decrease the functioning of migration corridor habitat. However, increases in spill efficiency through the installation and use of forebay guidance devices or removable spillway weirs, as proposed for the long-term hydro operation, would be expected to diminish the overall impacts of reducing spill from the reference operation.

11.4.2 Effects of Habitat Restoration Activities on Tributary and Estuarine Conditions

The Action Agencies propose habitat restoration activities in spawning and rearing tributaries and in the estuary to offset effects of hydrosystem operations. The proposed activities may result in short-term adverse effects on a variety of habitat parameters that influence the viability of salmonid, groundfish, and coastal pelagic species. Potential effects on habitat include:

- Temporary loss of riparian/estuarine function in areas under consideration
- Short-term increases in turbidity pursuant to the construction activities

- Potential introduction of pollutants into waterbodies during construction
- Potential modification of stream morphology in ways that are inadvertently detrimental to fish.

The long-term effects of these projects are expected be positive.

11.4.3 Effects of Predator Control on EFH

11.4.3.1 Effects of Predator Control on EFH for Salmonids

Prior to the Action Agencies' instituting the Northern Pikeminnow Management Program (NPMP), this predator accounted for approximately 8% of the predation-related mortality of juvenile salmonid migrants in the Columbia River basin (Section 6.3.2.4). The existing NPMP, which the Action Agencies propose to continue, has reduced the pikeminnow predation-related mortality rate to approximately 6%. The Action Agencies propose to expand the NPMP, which would result in an approximately 0.6% further reduction in predation-related mortality to an estimated 5.4%. The Action Agencies estimate that this reduction applies to all the salmonid ESUs.

The Action Agencies also propose to implement additional Caspian tern management actions to reduce predation of juvenile salmonids in the Columbia River estuary consistent with the preferred alternative in the forthcoming joint Corps/USFWS/NOAA Fisheries Final Environmental Impact Statement (FEIS) on Caspian tern management. The draft joint Corps/USFWS/NOAA Fisheries EIS on Caspian tern management is currently available for public review and comment. The implementation schedule assumes that a Record of Decision (ROD) for the Caspian Tern EIS between the Corps and USFWS will be signed in February 2005. Based on the projected levels of tern colony size resulting from implementation of alternatives C and D of the draft EIS, NOAA Fisheries estimates the survival improvements for Columbia basin salmonids shown in Table 6.11.

11.4.3.2 Effects of Predator Control on EFH for Groundfish and Coastal Pelagic Species

Roby *et al.* (2002) reported that Caspian terns nesting on East Sand Island consumed sardines, anchovies, and unidentified flounder (potentially starry flounder). Therefore, implementation of the UPA (relocation of Caspian terns outside the Columbia River estuary) would probably reduce predation rates on these species, as well as listed salmonids.

11.5 CONCLUSION

NOAA Fisheries concludes that the Updated Proposed Action would adversely affect EFH for Columbia basin chinook and coho salmon, English sole, starry flounder, the northern anchovy, and the Pacific sardine**.**

11.6 EFH CONSERVATION RECOMMENDATIONS

Pursuant to the § 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies, including itself, regarding actions that would adversely affect EFH. The applicable conservation measures described in the Updated Proposed Action dated November 24, 2004 will be implemented by the Action Agencies. These measures, as well as those terms and conditions outlined in Section 10.0 of this Opinion, are generally applicable to designated EFH for chinook and coho salmon, English sole, starry flounder, northern anchovy, and Pacific sardine and together, address these adverse effects to the extent practicable. Consequently, NOAA Fisheries recommends that both the UPA and the terms and conditions in Section 10.0 be adopted as EFH conservation measures.

11.7 STATUTORY RESPONSE REQUIREMENT

Pursuant to the MSA (§ 305(b)(4)(B)) and 50 C.F.R. § 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. In case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

11.8 SUPPLEMENTAL CONSULTATION

The Action Agencies must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 C.F.R. 600.920(k)).